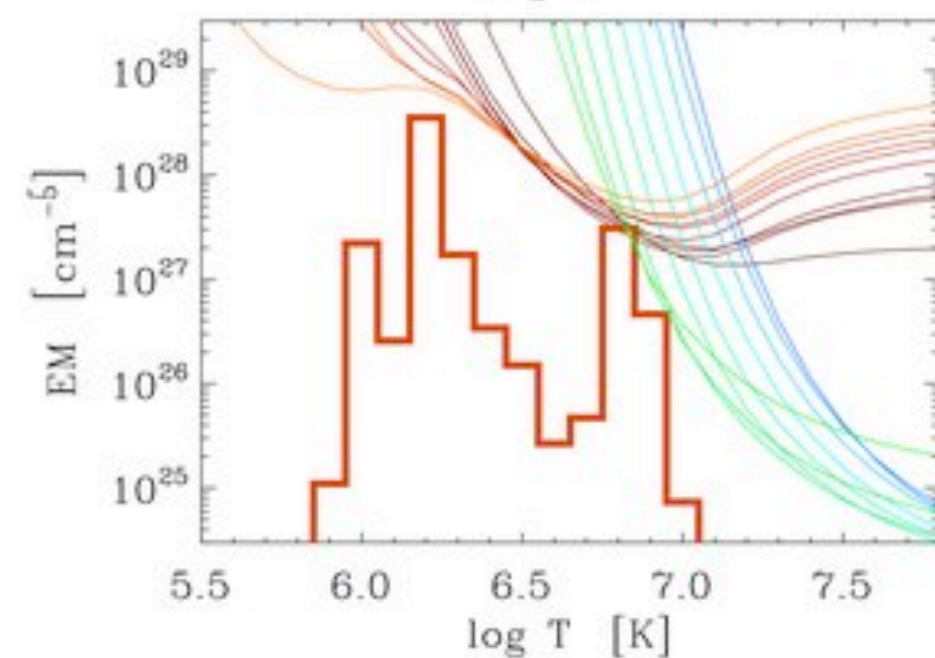
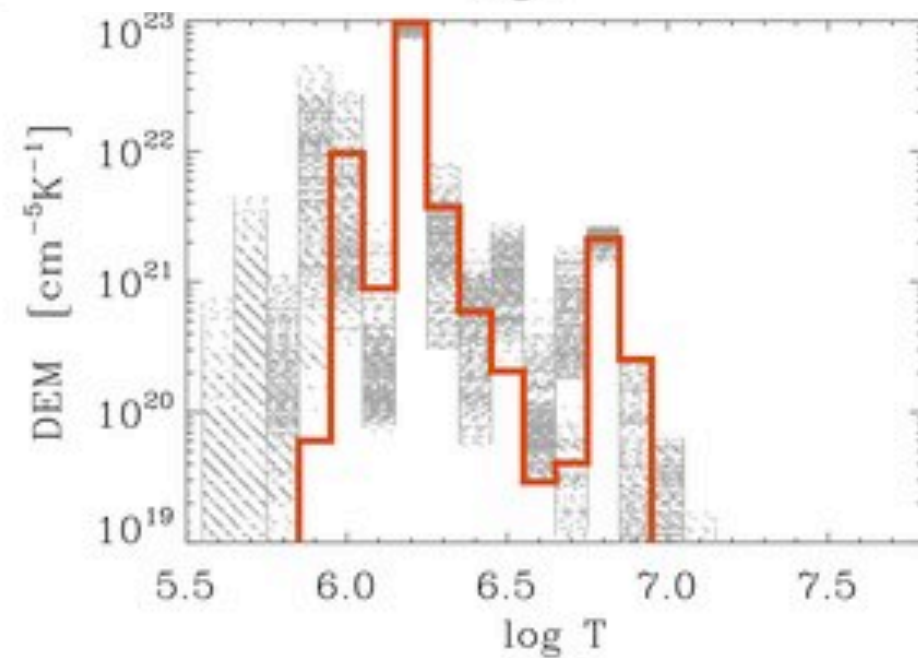
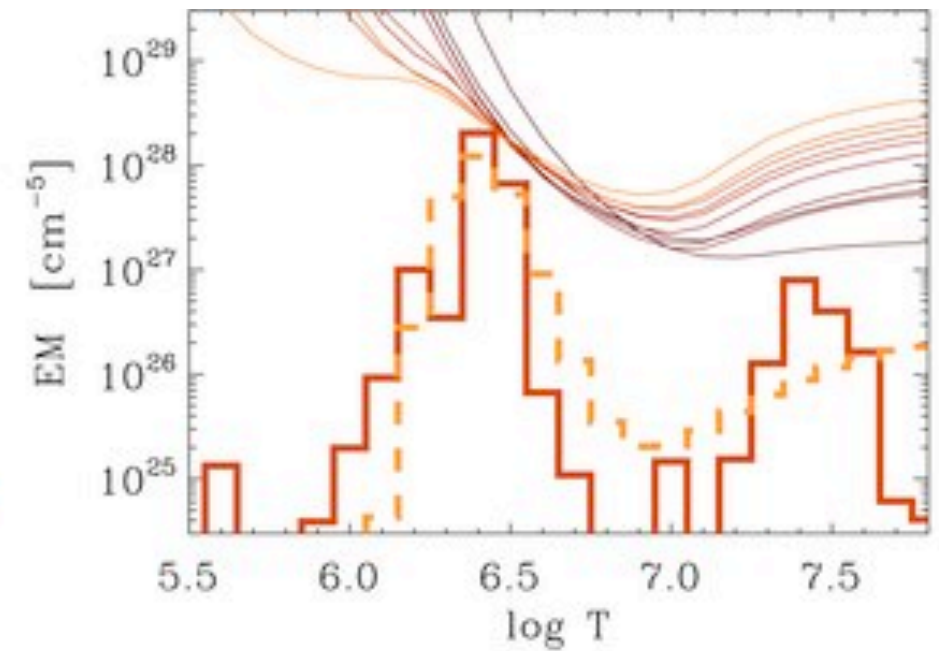
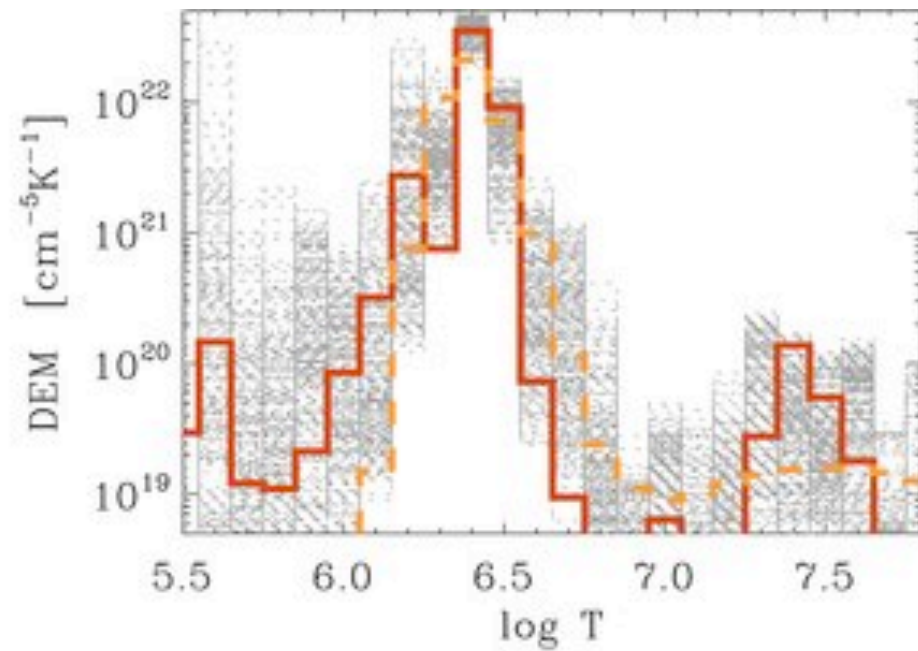


Determining the Differential Emission Measure from EIS, XRT, and AIA

Winebarger, Warren, & Schmelz

Recent Results



Schmelz et al., ApJ, 2009
(see also Reale et al., ApJ, 2009)

Important Questions

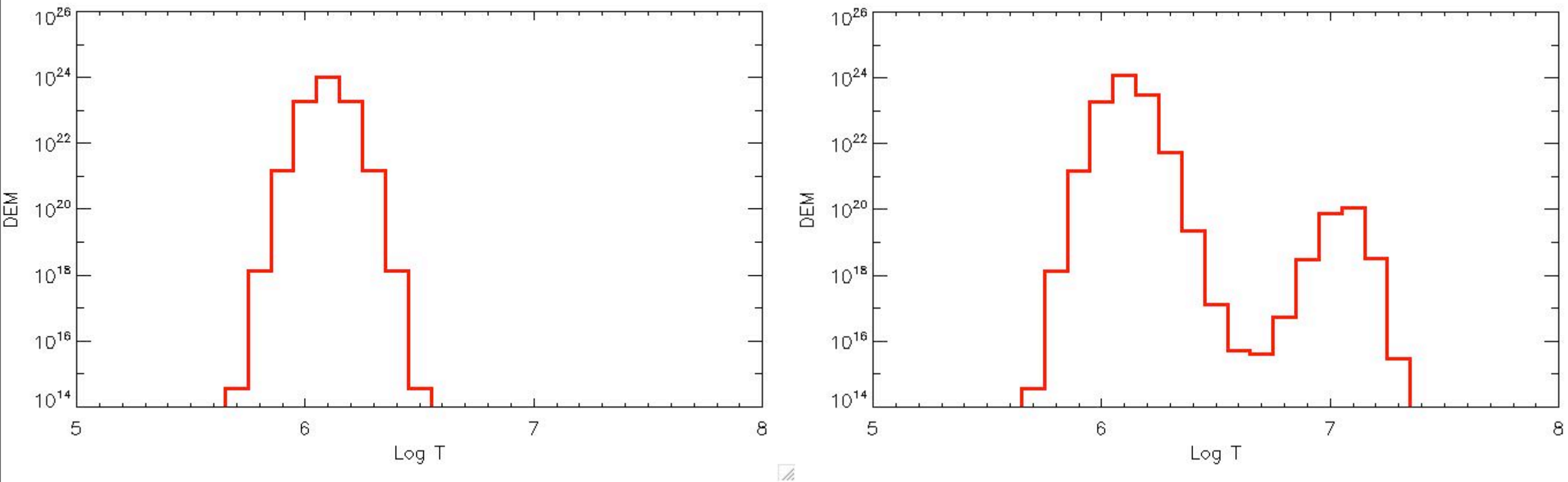
- Hot component could be an important key to constraining the coronal heating mechanism.
- What lines/filters are essential to better constrain the hot component?

Procedure

- Assume a DEM with and without a hot component.
- Calculate AIA + Hinode intensities.
- Calculate a DEM using `xrt_dem_iterative2` from AIA intensities alone, then adding filters/lines from Hinode.
- Determine the goodness of each calculated DEM at the hot component temperature.

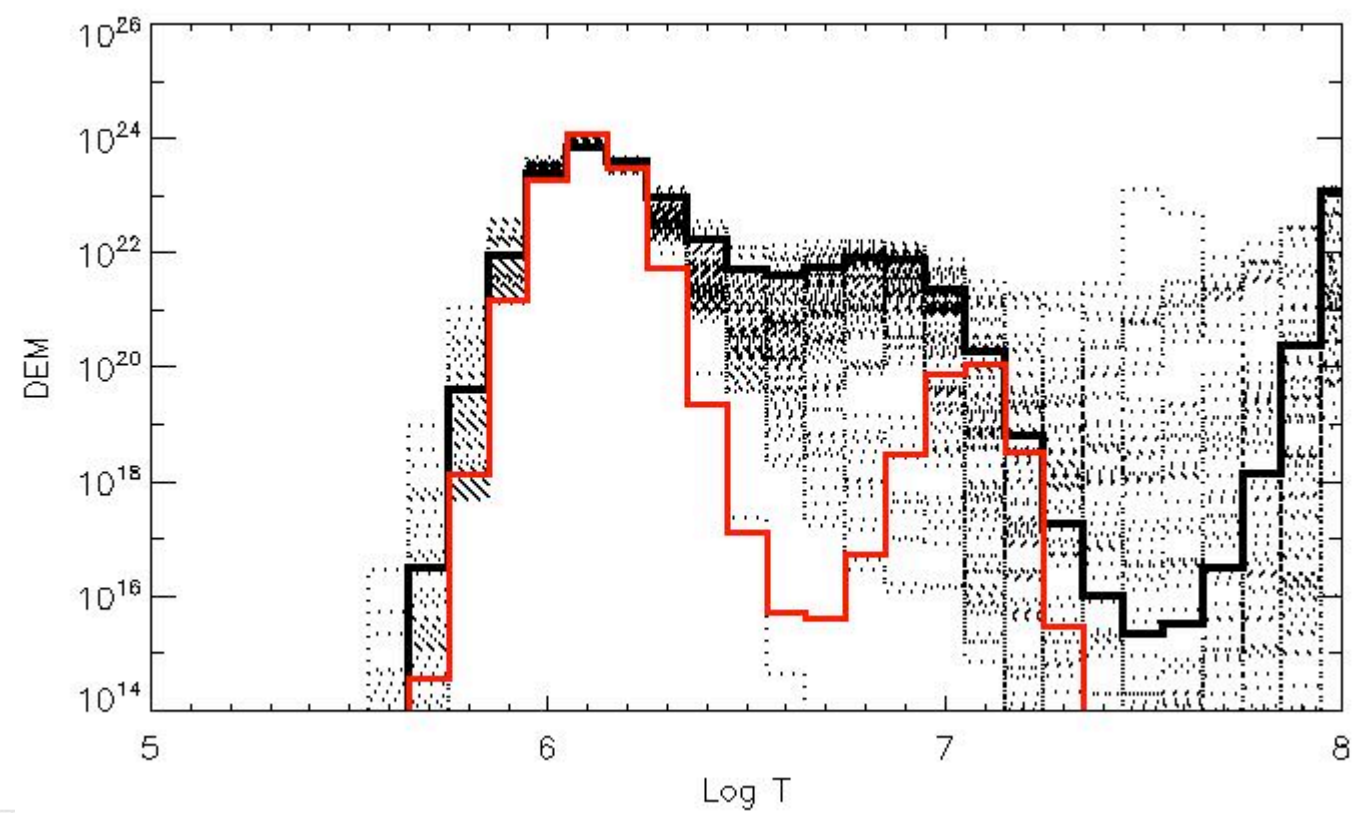
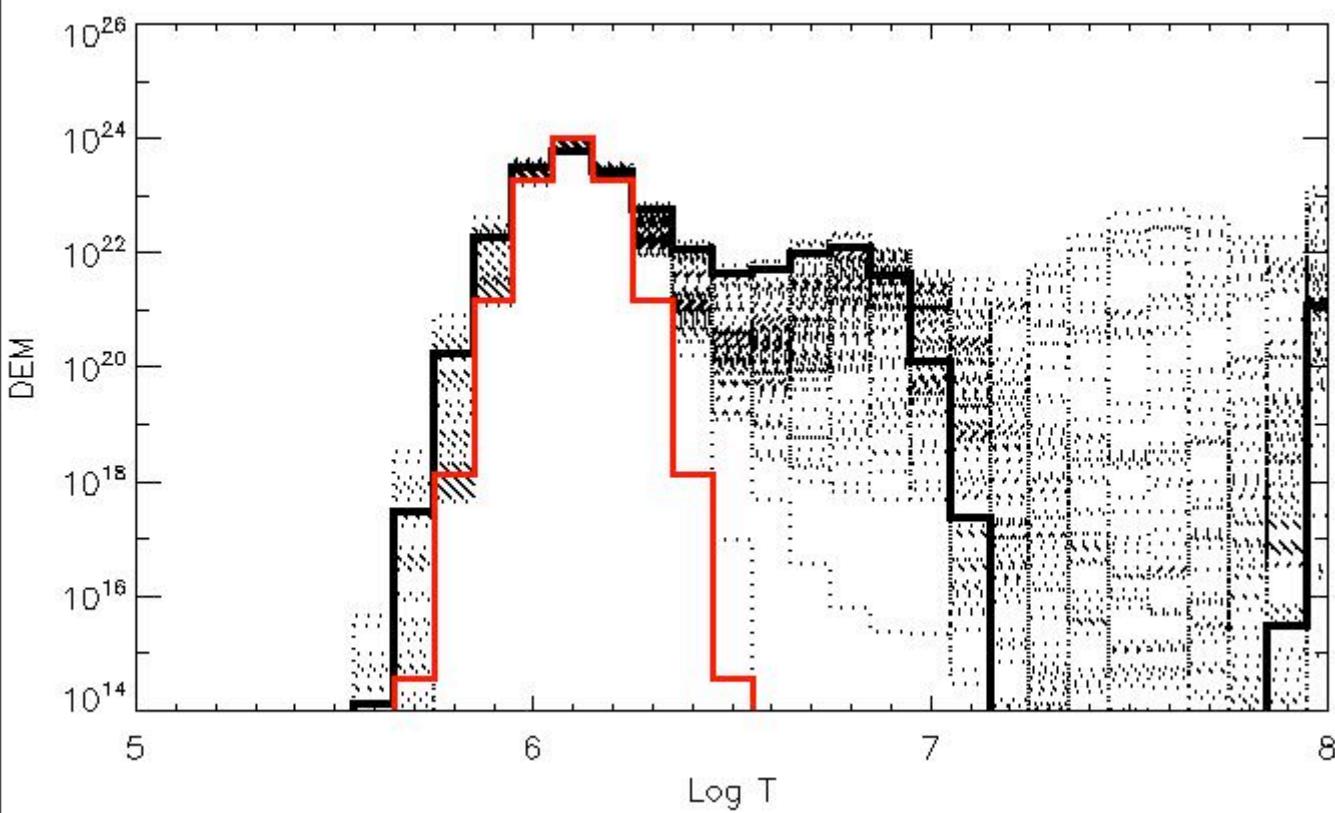
Model DEM

Cool component @ 6.1 + Hot component @ 7.1



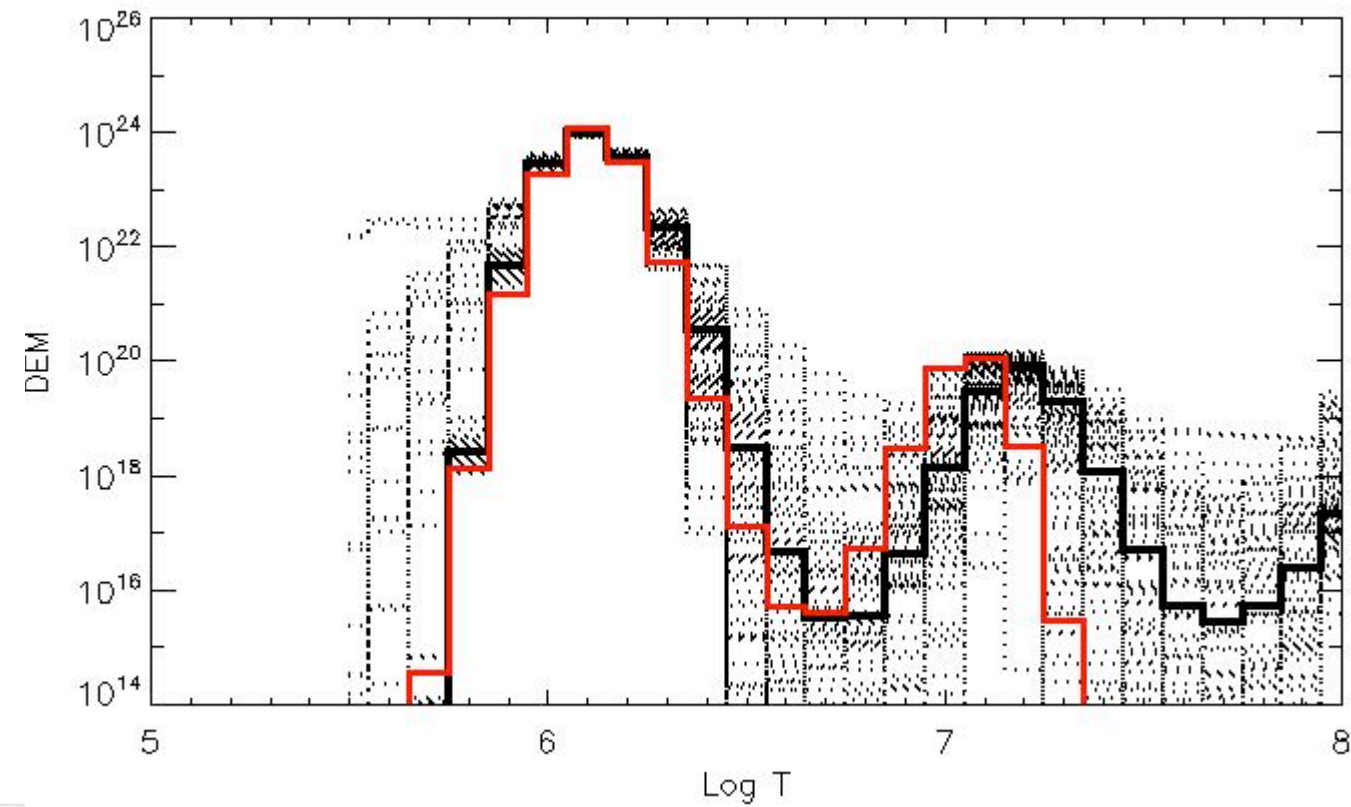
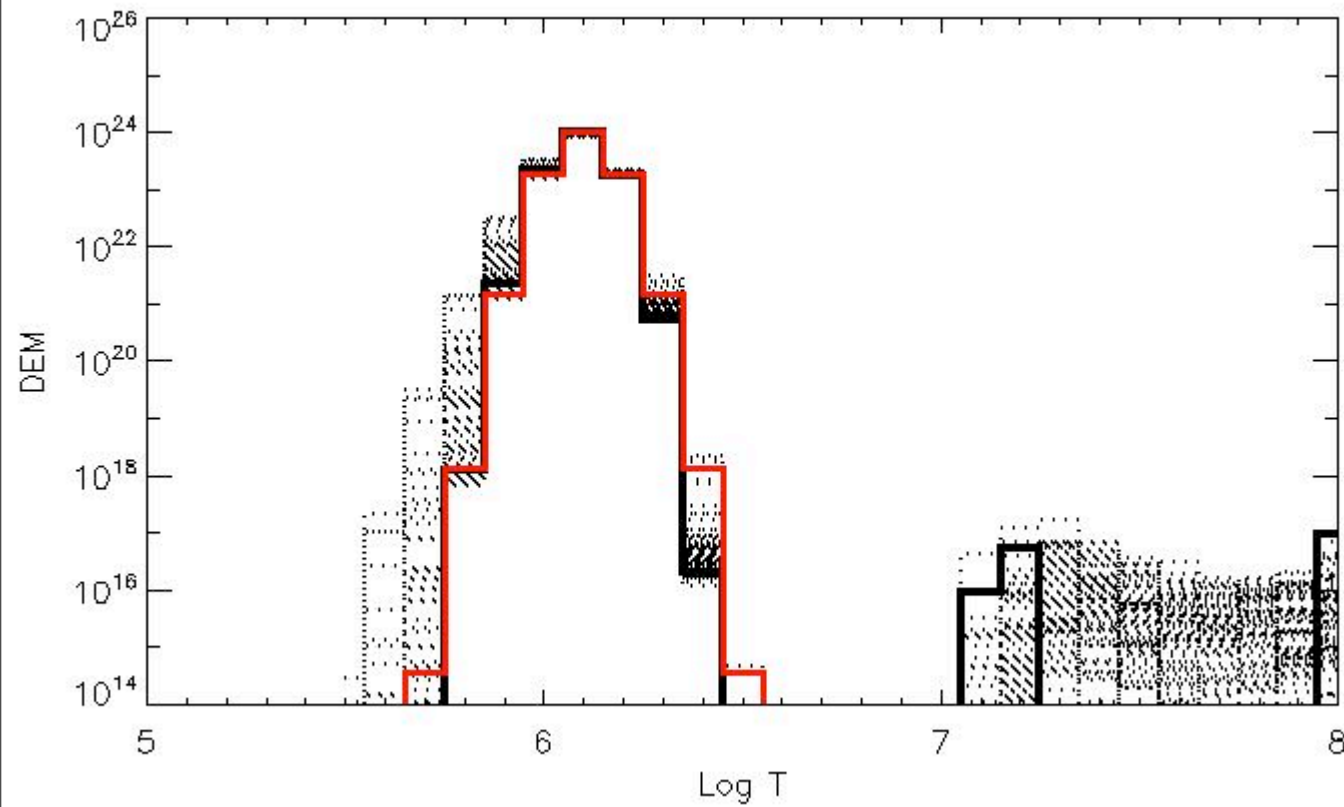
AIA Only

7 AIA channels



AIA + XRT

7 AIA channels, 15 XRT filters



Common Observations

EIS Lines:

Fe X 184.536
Fe XI 188.216
Fe XII 195.119
Fe XIII 203.826
Fe XIV 264.787
Fe XV 284.160
Fe XVI 262.984
Si VII 275.368
Ca XVII 192.858

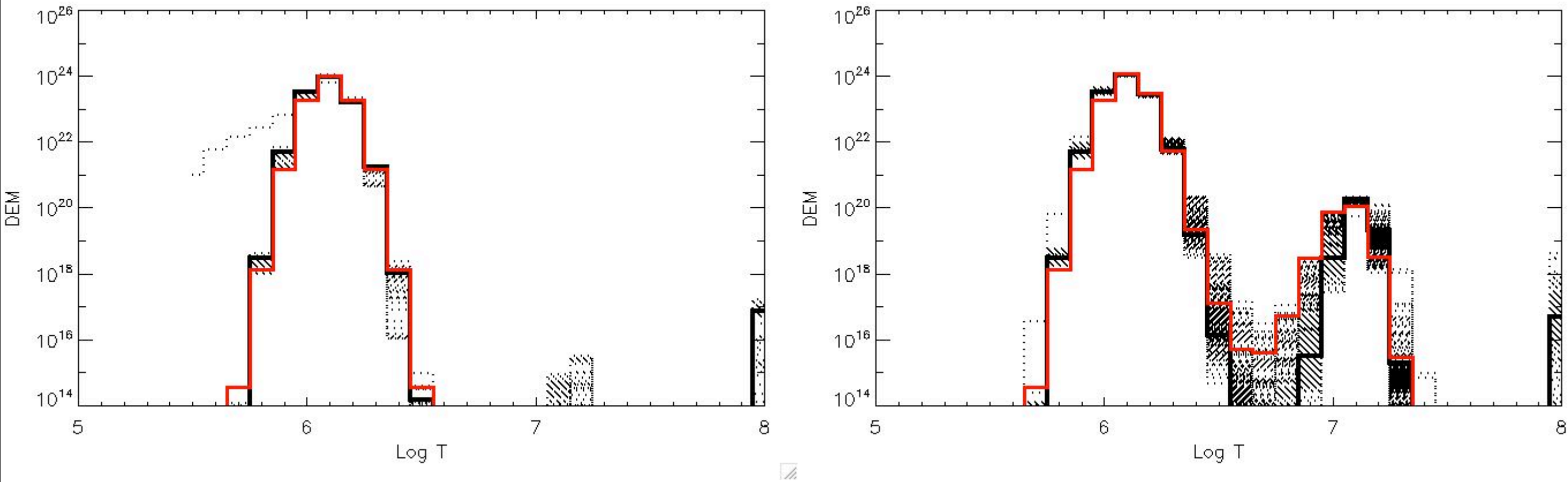
Ca XIV 193.874
Ca XV 200.972
Ca XVI 208.604

XRT Filter Wheel 2:

Al-mesh
Ti-poly
Al-thick
Be-thick

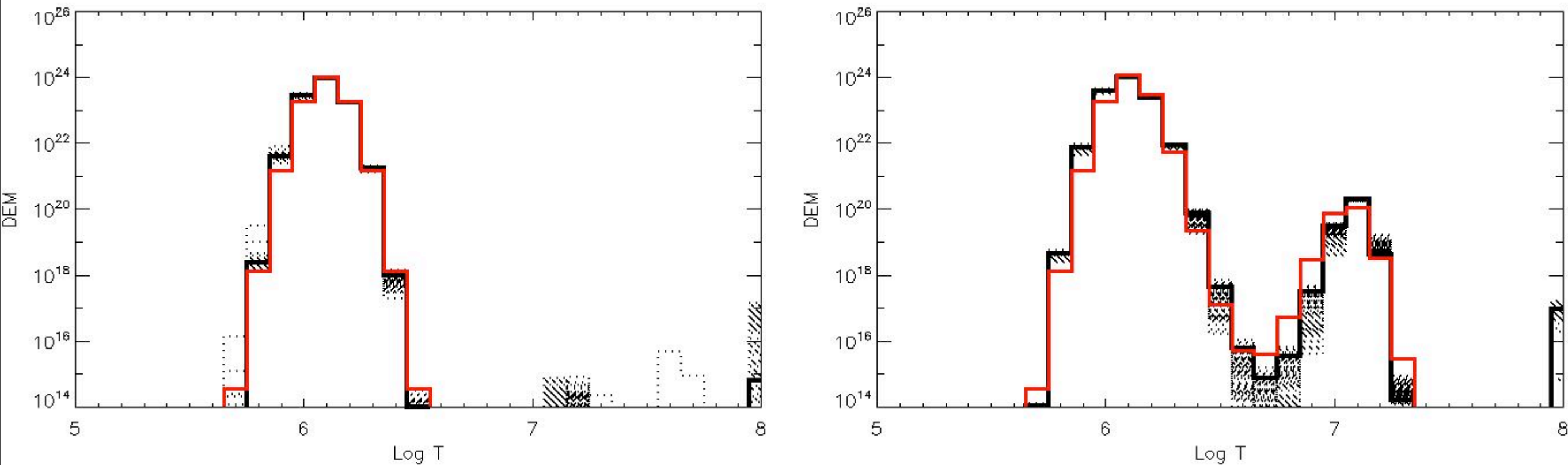
Common Observation

AIA + Filter Wheel 2 + common EIS lines



Common Observation

AIA + Filter Wheel 2 + common EIS lines + Ca lines

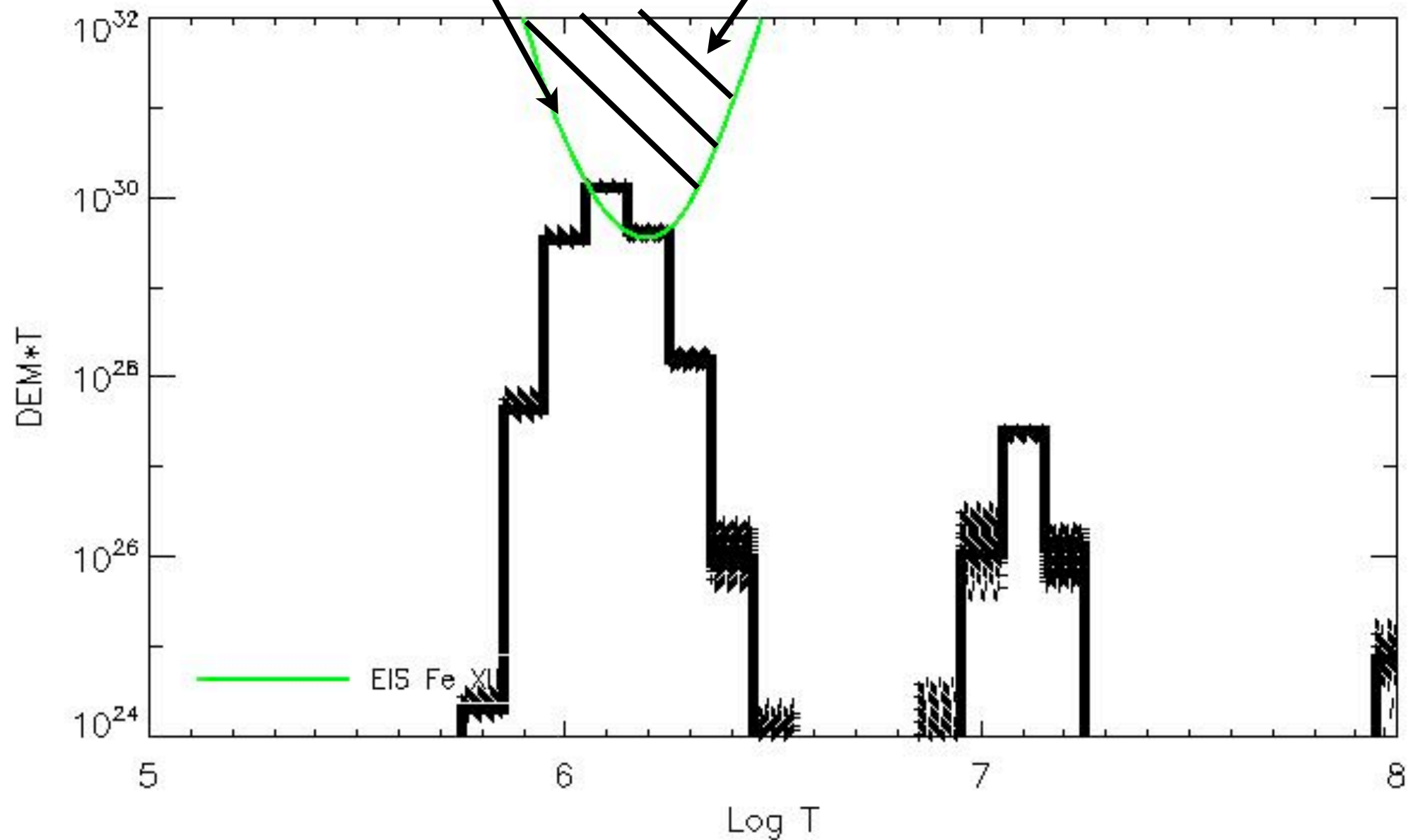


Ca lines greatly improve the DEM by constraining the DEM at lower temperatures.

Why?

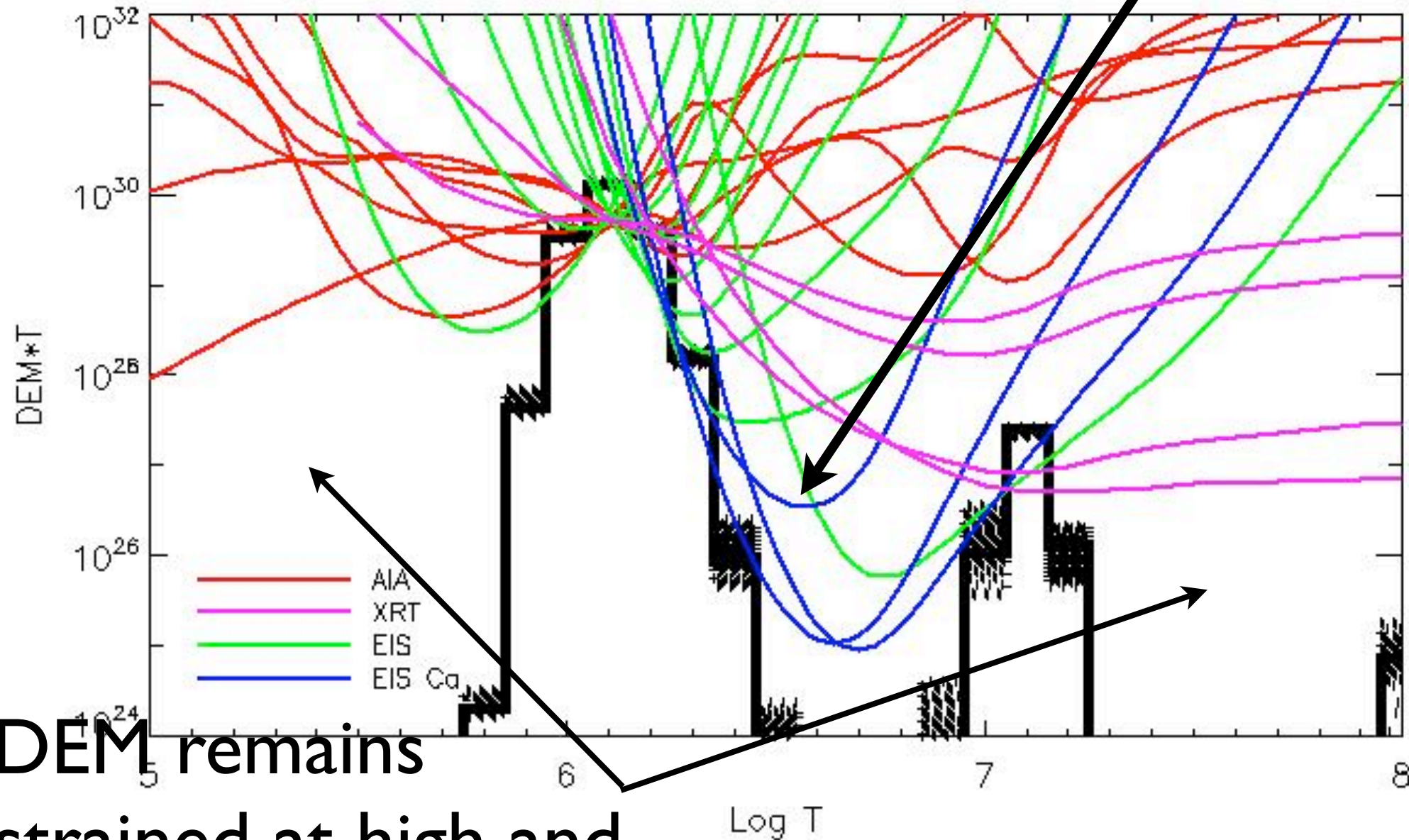
$$EM_{195} = I_{195} / G_{195}(T)$$

DEM cannot be in this region.



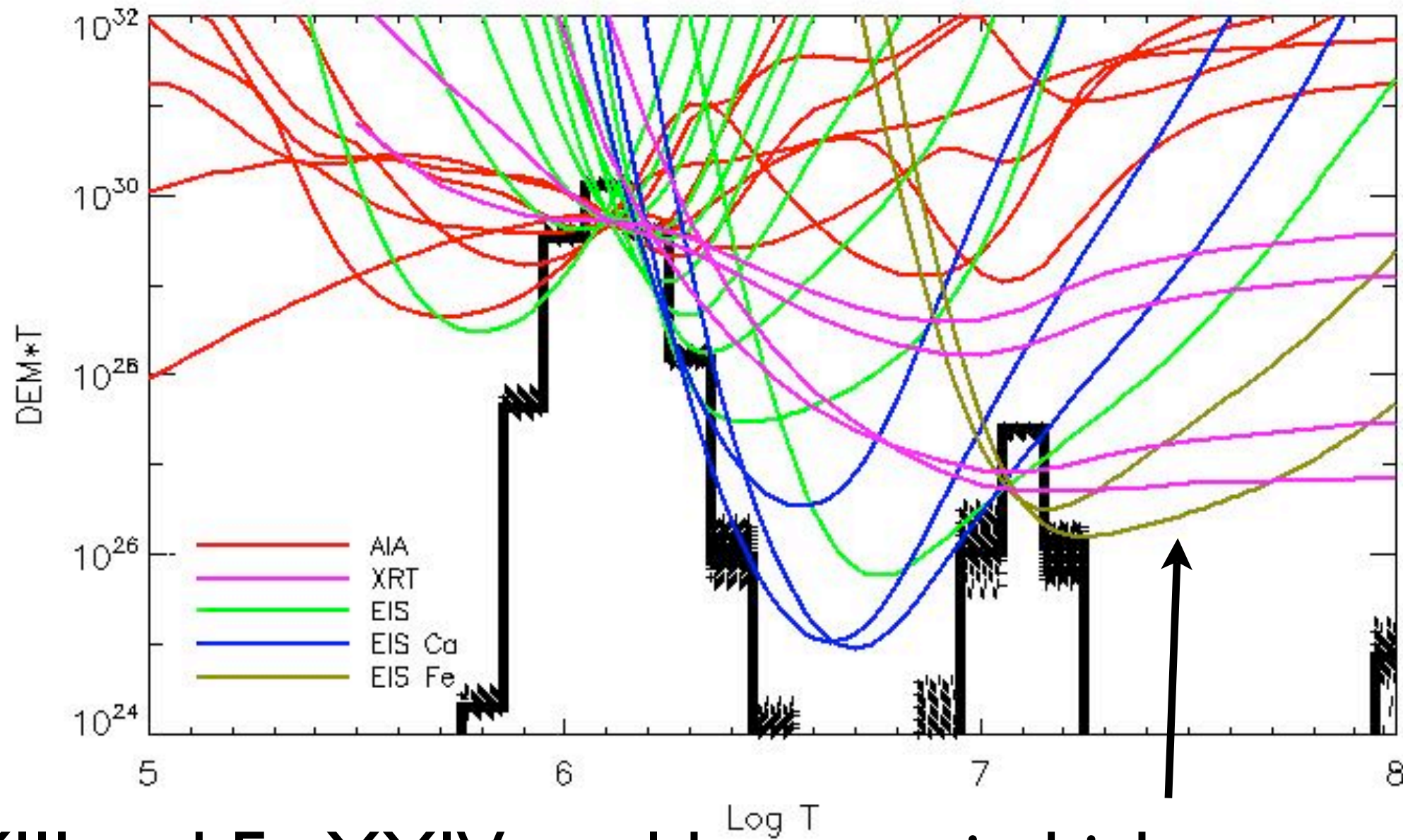
Why?

Ca lines constrain the DEM in this region.



DEM remains
unconstrained at high and
low temperatures.

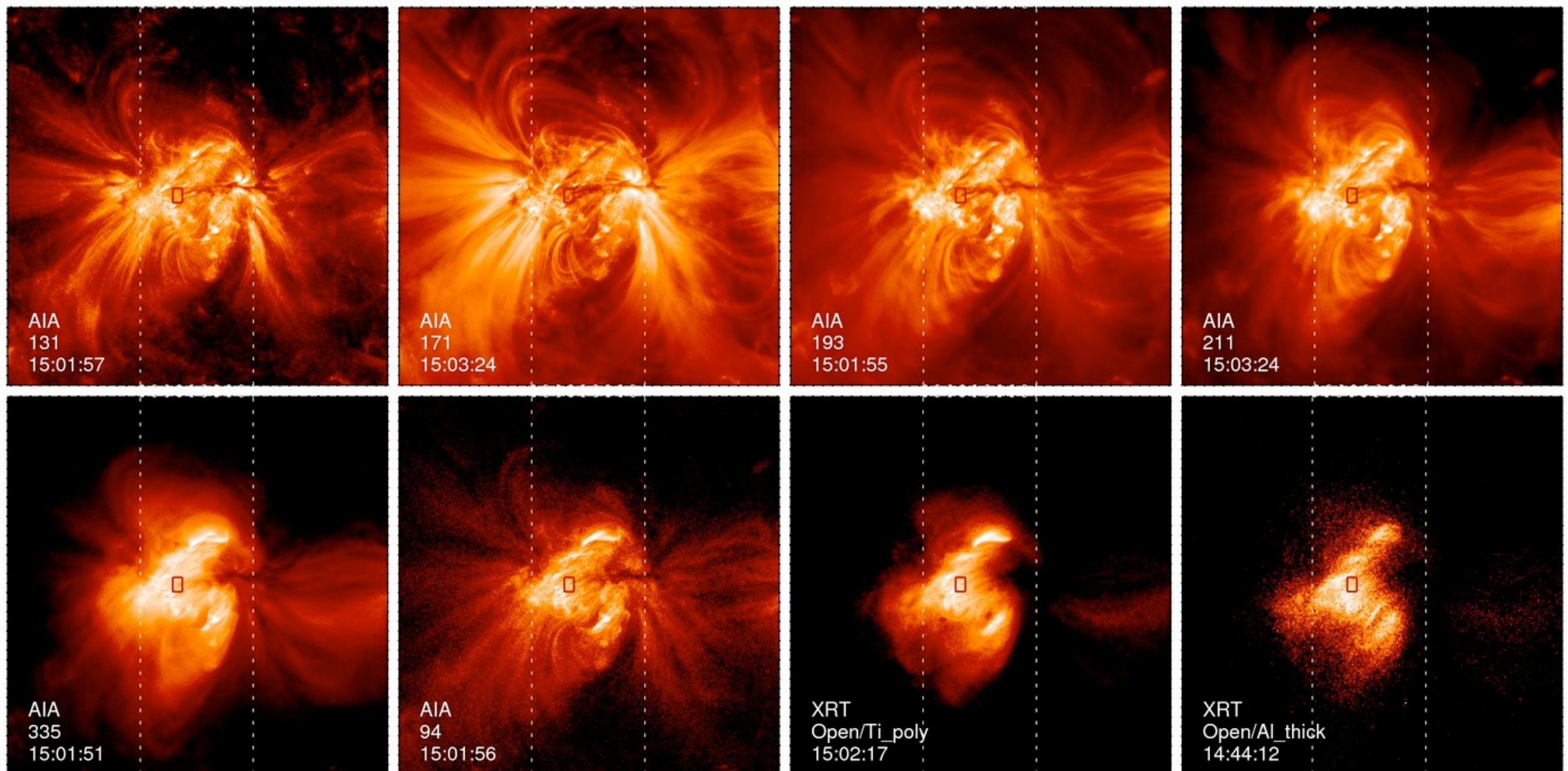
Why?



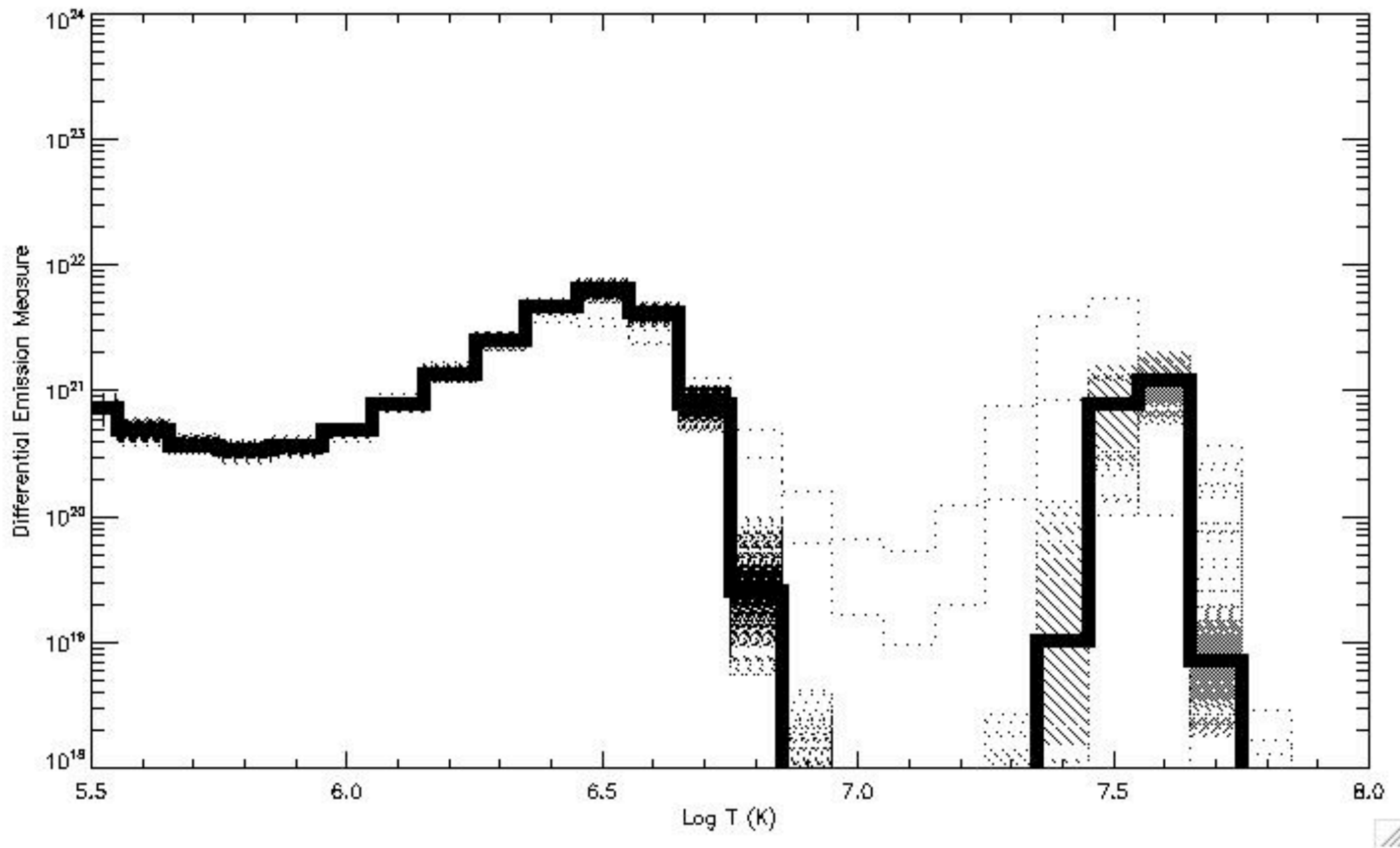
Fe XXIII and Fe XXIV could constrain high temperature component, but difficult to calculate.

July 23, 2010

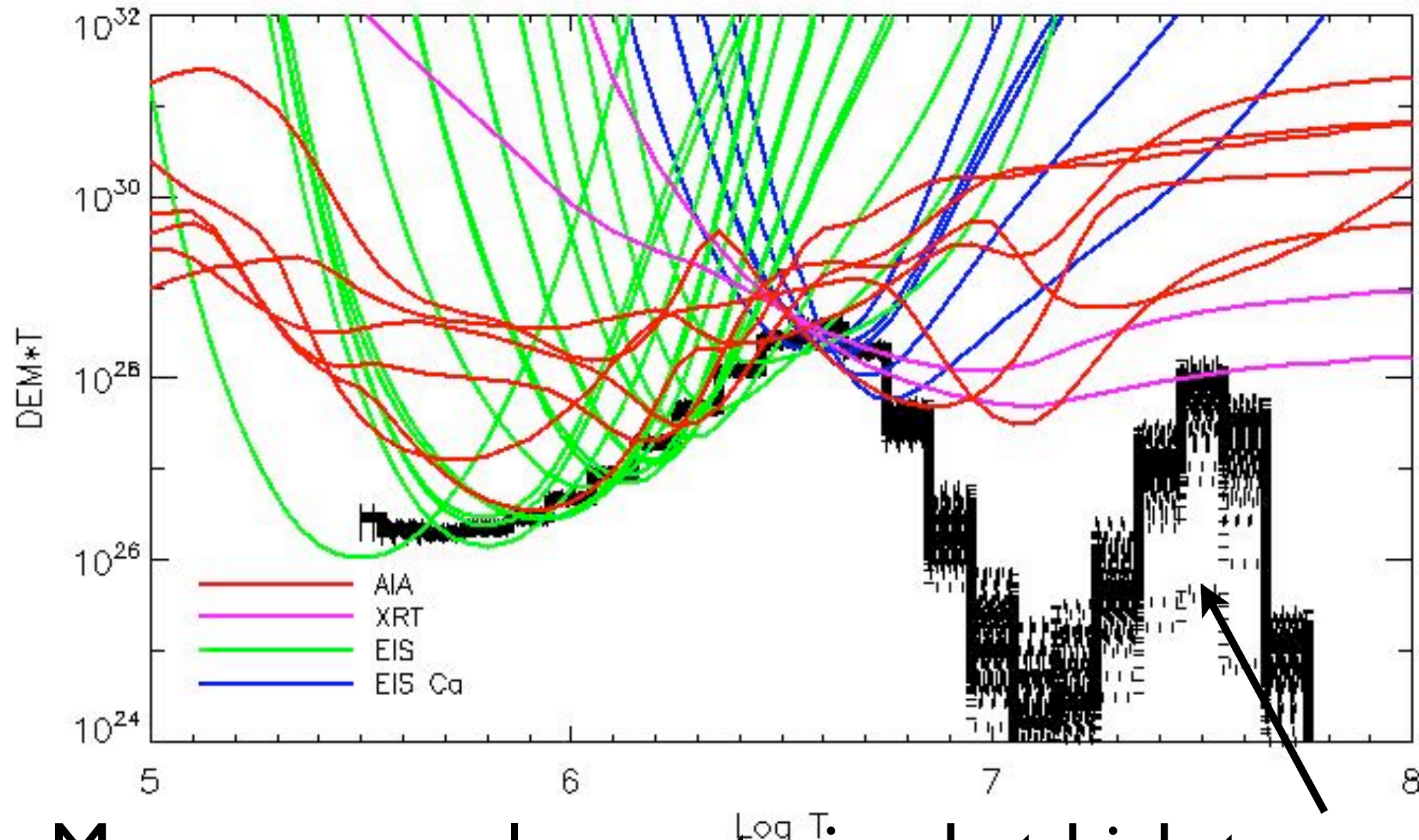
6 AIA channels, 2 XRT filters, and 21 EIS lines
including Ca lines



July 23, 2010



July 23, 2010



Emission Measure poorly constrained at high temperatures.
Predicted Fe XXIV emission is ~ 60 ergs/cm²/s/st.

Conclusions

- EIS Ca lines greatly constrain some DEMs - PLEASE observe them!
- “Hot” iron lines can also constrain the DEMs even though intensities are difficult to measure.
- Currently, high temperature component of AR emission is ambiguous.